



# An index for enabling socially inclusive digital innovation processes in food, land, and water systems

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# An index for enabling socially inclusive digital innovation processes in food, land, and water systems

## Summary

- Currently metrics for assessing digital inclusivity focus on evaluating the outcomes of digital innovation rather than the process of developing such innovations.
- Digital inclusivity has five different dimensions, spanning both technical and social aspects, and therefore requires a holistic approach to attain.
- We propose a digital inclusivity index as a holistic and standard guideline for enabling digital inclusivity in food land and water systems.
- Since formal research and development is skewed towards the Global North, such an index may embody the perspectives and interests of organisations based in the Global North, and will therefore require testing, validation and co-development with stakeholders based in the Global South.

## What's in an index and why is it important?

Digital innovations promise to provide solutions to various challenges facing food systems, and the interlinked land and water resources. These solutions include reliable information, faster communication, better and faster collection, processing, and storage of data, better decision support, improved working conditions, and improved transparency in supply chains and governance arrangements. However, there is a risk that a large section of the people that produce and distribute our food, including those with less formal education and skills, the less wealthy, the elderly and people who are economically and socially marginalised due to pre-existing norms will be sidelined from accessing, benefiting from, and participating in digital innovation. Additionally, there is potential harm that can be caused to certain groups of people or society in general by digital innovation processes and outcomes. To harness the potential of digital innovation to transform food systems, especially in less industrialised countries, it is therefore important to foster inclusivity by reducing or eliminating these risks<sup>1</sup>. One of the ways to achieve this is through standard indicators and metrics for enabling digital inclusivity.

However, available metrics and indicators mainly focus on how the outcome of digital innovations such as digital technologies can be made accessible and usable to groups of people that are socially or economically marginalised<sup>2</sup>. What is currently lacking is the metrics and indicators for signalling how the process and procedures rather than the outcomes of digital innovations can be socially inclusive. Such an index will need to go beyond enabling access and use of digital technologies or services, and consider a more

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<sup>1</sup> Lioutas, E. D., Charatsari, C., & De Rosa, M. (2021). Digitalization of agriculture: A way to solve the food problem or a trolley dilemma?. *Technology in Society*, 67, 101744.

<sup>2</sup> Mahlangu, G., Zhou, M., & Matsika, C. (2022). Multidimensional Factors Enabling Digital Inclusion in Marginalised Communities of a Developing Economy. In *Digital Transformation for Promoting Inclusiveness in Marginalized Communities* (pp. 1-20). IGI Global.

holistic understanding of digital inclusivity that incorporates different aspects of inclusion. Under the CGIAR Initiative on Digital Innovation, we propose such a multi-dimensional and process-oriented framework. In this brief, we present the key elements of the framework and outline the further steps that are necessary to develop this framework into a digital inclusivity index that can be useful as a standard guideline for promoting digital inclusivity.

## Definition of key terms

**Digital innovation:** The process of applying digital information, technologies, and services to develop solutions to social, economic and environmental challenges<sup>3</sup>. We focus on innovation because we would like to develop a solution-oriented index rather than an index that diagnoses digital inequality (focus on the process rather than outcomes on innovation).

**Digital ecosystem:** We think digital innovation occurs through collaboration and co-learning between different actors such as technology developers, rural communities, government officials, knowledge institutions, civil society, and funders, rather than through 'experts' that drive the digital innovation process.

**Targeted actors:** In food, land, and water systems, people with less formal education and skills, the less wealthy, the elderly, smallholder farmers in rural areas, and women are likely to be excluded from participating and benefiting from digital innovation. The particular group of people that is excluded differ based on context. We therefore use the term 'targeted actors' to groups of people that are identified to be excluded by a digital inclusivity intervention and therefore targeted for inclusion.

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<sup>3</sup> Rijswijk, K.et al. (2021). Digital transformation of agriculture and rural areas: A socio-cyber-physical system framework to support responsabilisation. Journal of Rural Studies, 85, 79-90.

**Food systems:** Actors, activities, rules, and norms involved in the production, distribution, and consumption of food as well as the resources linked to it such as land and water.

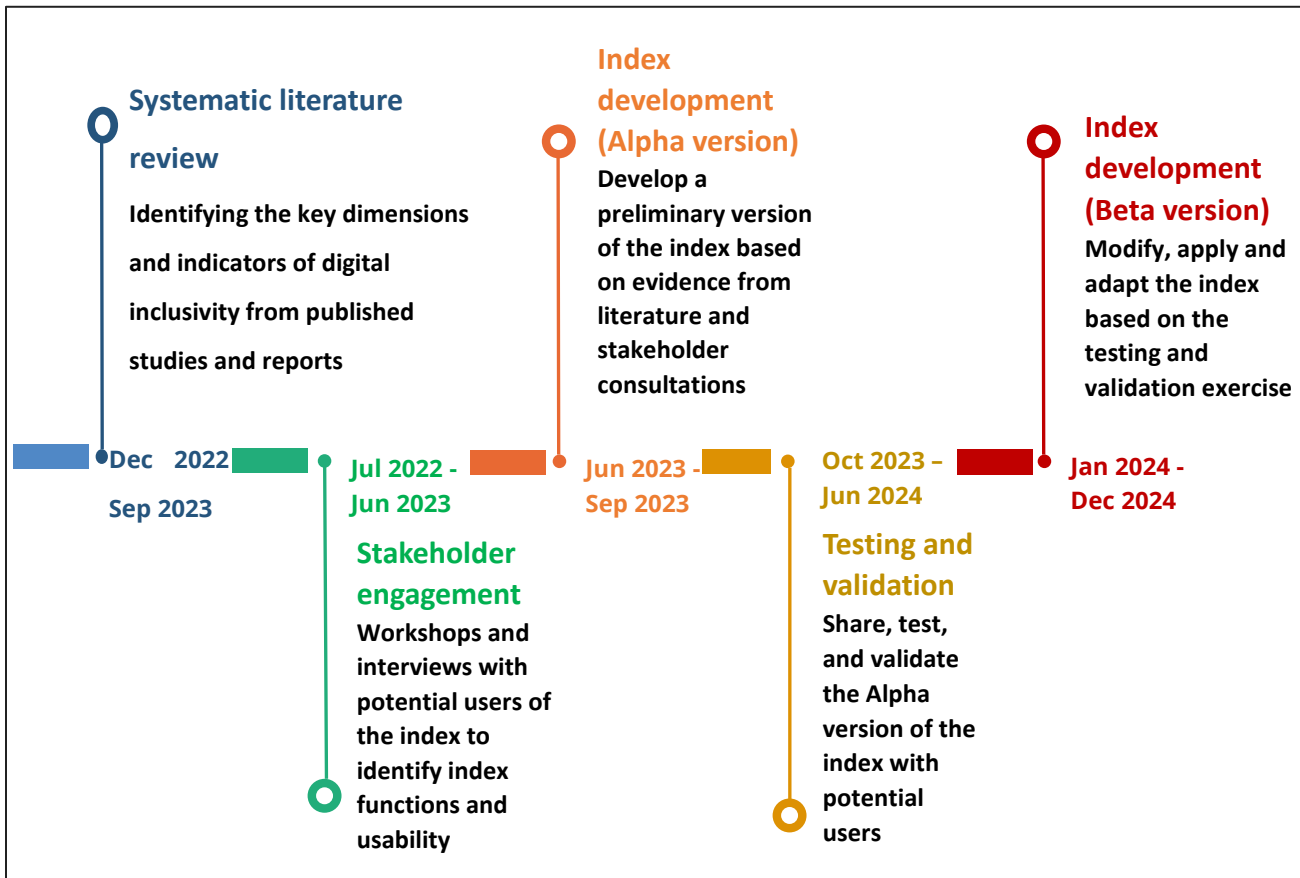
## Approach to the index development

We use a participatory approach to the index development process with the following three main work streams:

- Identifying the dimensions and indicators of digital inclusivity from literature that will be used as a prototype of the index (This is done through a systematic review and synthesis of literature)
- Consultations with different stakeholders in 6 countries (Rwanda, Kenya, Bangladesh, India, Guatemala, South Africa) to identify potential users and functions of the digital inclusivity index (This was done through stakeholder workshops and informal interviews)
- Presenting evidence from literature and prototype of the index to identified potential users to refine, test and develop a final version of the index (Through seminars and digital inclusivity reviews of selected cases in South Africa, Kenya, Bangladesh, and India)



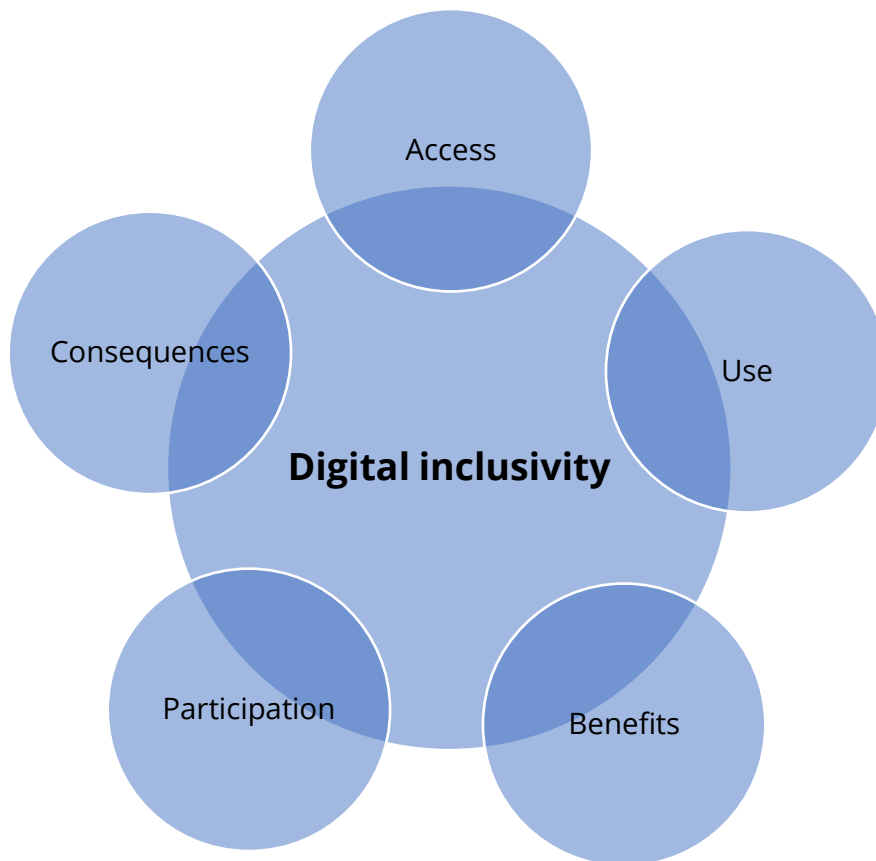
# Roadmap for the index development



## The five dimensions of digital inclusivity

Based on our findings, we propose the following five dimensions for promoting digital inclusivity in food, land, and water systems: access, use, benefits, participation, and consequences. First, digital innovations should be accessible to the targeted actors. This can be through making digital infrastructure such as internet and mobile connectivity as well digital innovation packages available and affordable to these actors. Secondly, access is not sufficient as a criteria for inclusion and there should be initiatives to make digital innovations desirable and usable to the targeted actors. The second dimension is therefore that of use. Thirdly, the benefit of the digital technology to the targeted group of actors should be verifiable and able to be sustained over time. Fourth, participation of targeted

actors in the design, implementation and governance of digital innovation is a key element of inclusion. Finally, potential harm that can be caused by the digital innovation to the targeted actors should be evaluated and measures put in place to mitigate it. The figure below outlines these five dimensions of digital inclusivity in food, land, and water systems.



All the dimensions are equally important and interlinked, meaning that actions to promote inclusivity within one dimension can only be successful if inclusivity is attained to some degree in the other dimensions as well. Each of the dimensions has four or five indicators that stipulate tangible actions that can be taken to realise social inclusivity (a total of 22 indicators across the five dimensions). We propose these dimensions and indicators as an alpha version of a digital inclusivity index that can be further developed through testing and validation with various potential users of the index.

Example: Indicators under the access dimension:

Dimension	Indicators of inclusivity
<b>Access</b>	<p>A1. Are targeted actors adequately informed of the digital innovation and its benefits?</p> <p>A2. Are resources are allocated for setting up and maintaining sufficient and affordable digital infrastructure in areas where targeted actors live?</p> <p>A3. Are digital innovation packages made affordable to targeted actors?</p> <p>A4. Are the technology use habits, preferences, desires, and competencies of targeted actors analysed and used in designing digital innovation?</p>

## Towards a beta version of the index

The five dimensions and twenty-two associated indicators developed so far is an alpha version of the index, which needs to be developed into a beta version through testing, validation, and co-development with different stakeholders in the food systems of the global South. This is because formal research and development is mainly done by institutions based in the Global North. Since this index is development from a synthesis of published studies and reports, there is a risk that it may embody perspectives from the Global North, and therefore not aligned to the opportunities, needs and perspectives of the Global South. We therefore identify potential users of the index in the food systems of the Global South who can be collaborators in testing and further development of the index. These include government and non-governmental development project administrators for whom the index can be a useful tool for evaluating and reviewing their programs on digital innovation. Secondly, knowledge institutions such as universities and international research institutions can use the index to influence policy and funding directions. Third, social enterprises working in the digital innovation space can use the index as a tool to review and tailor their services and products to ethical and inclusive. Finally, the index can

provide a platform for different actors to collaborate on attaining digital inclusivity. A number of the aforementioned stakeholders in South Africa, Bangladesh, and Kenya have been identified for the testing and validation exercise.

## Next steps and future considerations

Different stakeholders have different needs, and the index might require adaptation to different contexts without compromising on its value as a holistic guideline for fostering digital inclusivity. One way of attaining this could be through assigning different weights to the dimensions and indicators for different stakeholders. For instance, governments mainly work on the access dimensions since it is their mandate to provide affordable and available digital infrastructure, technologies and services to the public. The access domain could therefore be more significant to government agencies compared to other domains. There might also be a need to adapt the index to various contexts. For instance, in food systems, the elderly are the predominant food producers in the Global South, yet they are among the most excluded from using, benefiting from or participating in digital innovations. An index specifically for including the elderly could therefore be an important adaptation of the index. Besides adaptation for specific groups of people, variations of the index could also be developed for different regions or countries. Whether such adaptations are necessary, and how they should be made can also be made after the testing and validation exercise with the identified potential users of the index.

# How to use the digital inclusivity index to review an organisation or intervention

